

# Bay Breezes

Serving the San Francisco and Monterey Bay Areas

Winter 2005/2006

December 18, 2005

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## Coming Soon: San Francisco Bar Forecast

by Shawn Weagle

The National Weather Service San Francisco Bay Area Forecast Office is working together with the Coast Guard and the local marine community to make the waters outside the Golden Gate safer for mariners.

A new marine forecast is being developed for the San Francisco Bar, an area of shallow water

just outside the Golden Gate. The San Francisco Bar includes Potato Patch Shoal and Four-fathom Bank near Point Bonita, and the South Shoal off of Ocean Beach in San Francisco. Deep water swells interact with the shallow water across the Bar to produce dangerous seas that are much higher and steeper than other portions of the

coastal waters. Every year, the Coast Guard receives numerous distress calls from mariners caught unaware by the pounding surf. Compounding the problem is the proximity of the Bar to the San Francisco Bay, attracting numerous recreational boaters who may not be familiar with the locally dangerous

*(Continued on page 2)*

## New Public Forecast Zones

by Duane Dykema

Recently the Monterey Forecast Office reconfigured its public forecast zones. The reconfigured zones went into effect on Thursday, October 20, 2005. Prior to reconfiguration, there were nine public forecast zones. Boundaries for these nine zones were primarily county lines.

County lines may be a convenient way to delineate forecast zones, but

political boundaries do not make a lot of sense from a meteorological point of view, particularly here along the west coast where a cold ocean and complex terrain result in significant weather variations across short distances. Thus, when the new forecast zones were developed, geographic features such as mountains, valleys, and the coastal strip were used

to describe the zones instead of counties. Zone boundaries now mostly lie along the 1000 foot elevation contour. The number of zones has increased from 9 to 15. The new zones provide better site-specific forecasts by affording forecasters the needed flexibility to separate and highlight smaller zones to more accurately reflect

*(Continued on page 4)*

### *Bar Forecast*

conditions just outside the bay.

Small recreational vessels are not the only ones impacted by the hazardous bar conditions. Large cargo ships entering through the Golden Gate to reach Oakland and other major ports can be delayed by the rough seas as tugboats may have difficulty navigating the massive commercial vessels into San Francisco Bay. Fishing operations off San Francisco and the San Mateo coast can be impacted by rough bar

conditions as well.

The waters across the San Francisco Bar can be as shallow as 25 feet, even as far as six miles from shore. So what causes this shallow water outside the Golden Gate? During rain events, silt and soil run off into local creeks and streams that are tributaries of the San Joaquin and Sacramento Rivers. This silt and soil are then transported into the San Francisco Bay via the Carquinez Strait and San Pablo Bay. Currents and tides then

carry the silt and soil out of the San Francisco Bay through the Golden Gate, where it is deposited onto the ocean floor over time.

During major winter storms, powerful deep water swells are generated over the Gulf of Alaska and travel all the way to the California coast. A modest storm will provide swells 15 to 20 feet high across the coastal waters. However, over the San Francisco Bar, these swells can interact with the shallow water to pro-

***For further  
information  
regarding the  
Bar Forecast, or  
to receive a  
sample  
experimental  
forecast,  
contact Shawn  
Weagle at  
shawn.weagle  
@noaa.gov***



**Coast Guard maneuvers during rough bar conditions across the South Shoal, west of Ocean Beach.**

## Bar Forecast

duce breakers as high as 30 feet; large enough to easily overcome or capsize all but the biggest ships that transit the coastal waters.

The new forecast will be a specialized seas forecast for the Bar separating the conditions between the deep water ship channel and across the Bar as warranted. The forecast will also include times of maximum ebb current flowing out of the bay, which can be 5 knots or more. The ebb current counters the westerly or northwesterly swell, making the swell stand up producing higher and steeper waves, which can make for very nasty conditions over the bar. Previous forecasts combined the San Francisco Bar together with the rest of the coastal waters from Point Arena to Pigeon Point out to 20 nautical miles offshore, where conditions can be much lighter than across the Bar.

The U.S. Coast Guard and San Francisco Bar Pilots Association are playing a major role

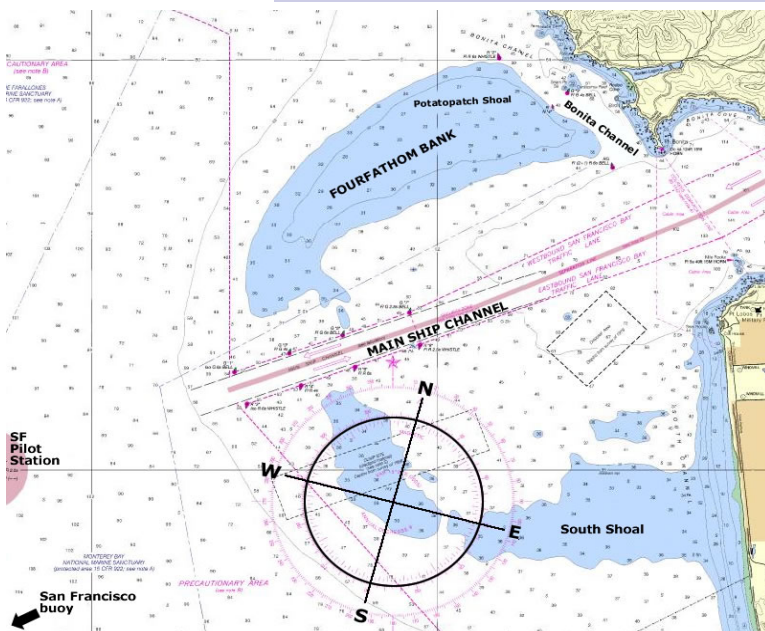
in the development of this forecast, providing observations and feedback about our experimental forecasts. Everyone involved is working together to make the coastal waters safer for the marine community.

The San Francisco Bar forecast is expected to be operational and available to the public by the end of this winter.

*continued from page 2*



**USCG BMI Scott Baker from Station Golden Gate points out the subtleties of the San Francisco Bar to NWS Forecasters.**

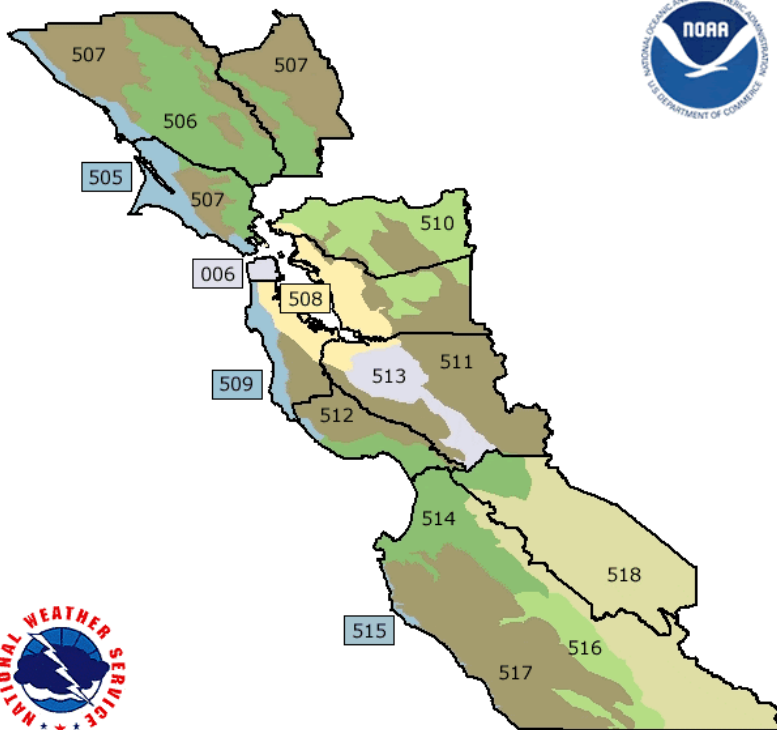


**Nautical chart showing the coastal waters west of the Golden Gate Bridge including the San Francisco Bar.**

*New Public Forecast Zones**continued from page 1***The old zones were as follows:**

<b>Zone 005</b>	<b>Sonoma and Marin Counties</b>
<b>Zone 006</b>	<b>San Francisco</b>
<b>Zone 007</b>	<b>Alameda and Contra Costa Counties</b>
<b>Zone 008</b>	<b>Santa Clara County</b>
<b>Zone 009</b>	<b>Coastal Monterey County</b>
<b>Zone 010</b>	<b>Interior Monterey County/San Benito County</b>
<b>Zone 065</b>	<b>Napa County</b>
<b>Zone 074</b>	<b>Santa Cruz County</b>
<b>Zone 075</b>	<b>San Mateo County</b>

ongoing and predicted weather. These zones are used not only for the routine public forecast zone product, but also for many other non-routine weather products including wind advisories and warnings, frost advisories and freeze warnings, dense fog advisories, as well as some hydrological products.



**A map of the new zones is to the left. The table on page 5 shows the zone name and description for each new zone.**

*New Public Forecast Zones**continued from page 4*

Zone #	Zone Name	Zone Description
505	Coastal North Bay, Including Point Reyes National Seashore	Coastal Sonoma and Marin counties below 1000 ft and all elevations of Inverness Ridge in Point Reyes National Seashore
506	North Bay Interior Valleys	Interior Sonoma, Marin, and Napa counties below 1000 ft.
507	North Bay Mountains	Sonoma, Napa, and Marin counties above 1000 ft, excluding Inverness Ridge – see zone 505
006	San Francisco	
508	San Francisco Bay Shoreline	Bayside sections of San Mateo, Alameda and Contra Costa counties below 1000 ft. Bayside sections of Santa Clara county below 1000 ft and north of highway 237.
509	San Francisco Peninsula Coast	San Mateo county coastal strip below 1000 ft, including all elevations of Montara Mountain. Santa Cruz county coastal strip below 1000 ft Davenport and northward.
510	East Bay Interior Valleys	Interior Contra Costa and Alameda counties below 1000 ft
511	East Bay Hills and the Diablo Range	Contra Costa and Alameda counties above 1000 ft. Santa Clara county – areas east of the Santa Clara Valley above 1000 ft.
512	Santa Cruz Mountains	Santa Cruz Mountains – above 1000 ft in San Mateo, Santa Cruz, and Santa Clara counties.
513	Santa Clara Valley, Including San Jose	Santa Clara Valley below 1000 ft. Northern boundary is highway 237. Southern Boundary is the Santa Clara county/San Benito county line.
514	Monterey Bay, Northern Salinas Valley, Hollister Valley and Carmel Valley	Coastal Santa Cruz county below 1000 ft south of Davenport. Costal Monterey county below 1000 ft north of Point Lobos. Salinas Valley - Soledad and northward and adjoining foothills below 1000 ft. Carmel Valley and adjoining foothills below 1000 ft. Hollister Valley and adjoining foothills below 1000 ft.
515	Big Sur Coast	Coastal sections of Monterey county south of Point Lobos below 1000 ft.
516	Southern Salinas Valley, Arroyo Seco and Lake San Antonio	Southern Monterey county interior south of Soledad below 1000 ft.
517	Santa Lucia Mountains and Los Padres National Forest	Monterey county mountains west of the Salinas Valley above 1000 ft.
518	Mountains of San Benito County and Interior Monterey County, Including Pinnacles National Monument	San Benito county above 1000 ft. Monterey county mountains east of the Salinas Valley above 1000 ft.

## 2005 Fire Season in Review

by Ryan Walbrun, *Incident Meteorologist (IMET)*

**For questions  
regarding the  
Fire Weather  
Program  
contact Ryan  
at  
ryan.walbrun@  
noaa.gov**

This 2005 Fire Weather season started a little later than usual but lasted until late November. The Bay Area had an unusually wet spring with lingering rain showers into the middle of June. This kept many of the grasses green as we approached the 4<sup>th</sup> of July Holiday. In fact the largest training burn of the season at Forth Hunter Liggett, in southern Monterey County, had to be cancelled due to wet fuels. Normally the training burn at Fort Hunter Liggett is scheduled for early June but

the late season rains kept the fuels too wet for good burning conditions.

By late June Santa Clara County was able to host the "Wildland 2005" live training burn which was held at Joseph Grant Ranch Park in Santa Clara County. Our newly certified IMET, Shawn Weagle, and I attended this burn and provided on-site meteorological support using the All Hazards Meteorological Response System. Forecaster Carolina Horne was also able to attend and go to the active fire line. The two day live training burn culminated with a final burn of several hundred acres while KNTV television in San Jose did a live broadcast from the event. Our office looks forward to working with Santa Clara County again next year.

Finally on June 29 and 30<sup>th</sup> IMET Shawn Weagle and Warning Coordination Meteorologist Dave Soroka provided on-site support for another training burn in the East Bay at Camp Parks. This

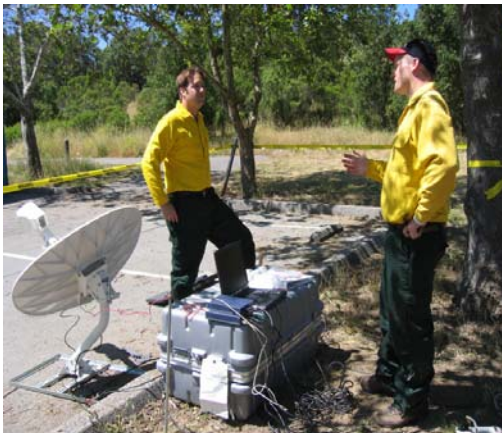
is the largest training burn in the East Bay with several fire agencies from Alameda and Contra Costa County involved.

By July the rain had ended and the typical hot and dry conditions developed across the inland areas of the Bay Area. Two particularly large grass fires were reported in the Livermore Valley during this time.

In early August I was dispatched as an Incident Meteorologist to the Deer Wildfire near Clear Lake. The fire was located in the Mendocino National Forest and burned nearly 1500 acres. During this same period IMET Shawn Weagle was dispatched to the Blossom Complex in southern Oregon. Shawn spent nearly two weeks on this fire, a large complex that literally burned for months in the dense forests of southwestern Oregon.

By late August I was dispatched to the Harding Wildfire located north of Truckee along Highway 89. As the cal-

(Continued on page 7)



**IMETs Ryan Walbrun and Shawn Weagle set up a remote weather unit for operations during the Joseph Grant Ranch Park training burn.**



## Fire Season Review

endar turned to September overnight lows in the high country dropped into the 20s and the fire was quickly put out after about 5 days of active firefighting.

Although much of September and October were dry, there weren't too many wildfires of note across northern California. This was most likely due to an absence of any strong offshore wind. However, a few Santa Ana wind events did develop across southern California helping to ignite a number of fires. By No-

vember, a two week period of record warmth developed across northern California. During this time Red Flag Warnings were in effect across much of the Bay Area. The combination of very dry fuels, low relative humidities and record warm conditions created a critical fire weather period. However there were no strong winds associated with the record warmth and fortunately no large wildfires erupted.

Shortly after Thanksgiving widespread wetting rains fell, effectively

ended the wildfire season across northern California.

*continued from page 6*



**IMET Shawn Weagle take meteorological reading in support of the Camp Parks training burn in the East Bay.**

## HAZCollect

When an emergency occurs, seconds count to save lives. Communicating the nature of an emergency and the recommended response for all affected citizens can take precious time. The National Weather Service communicates critical weather information on a daily basis and thus is an expert when it comes to relaying essential information to the media and general public.

Now, the same sys-

tem that speeds life-saving weather data to people can be used to inform the public about critical non-weather related local events when lives are at stake. Specific information from emergency services sources will now be able to take advantage of the reliable All Hazards NOAA Weather Radio system. This means necessary instructions will get out quickly when time counts. Your Na-

**by Dave Soroka**

tional Weather Service in Monterey is going to be one of the first offices in the Nation to utilize this new system described below, with a test period expected to commence during the first half of 2006.

This new system is called HAZCollect (short for All Hazards Emergency Message Collection) and has been developed nationwide by the National Weather

*(Continued on page 8)*

**For more  
information on  
the  
HAZCollect  
program visit:  
[www.weather.gov/los/hazcollect/](http://www.weather.gov/los/hazcollect/)**

**For  
information  
about our  
local  
HAZCollect  
program  
contact Dave  
Soroka at:  
(831) 656-  
1710 X223**

## ***HAZCollect***

*continued from page 7*

Service in coordination and cooperation with the U.S. Department of Homeland Security/FEMA. It will offer emergency services officials full distribution of critical emergency messages through NWS channels.

Count on HAZCollect to be the most responsive and direct way to speed critical information for protection of your citizens. When operational, HAZCollect is ready to link officials and the public with criti-

cal information should an emergency occur. When an incident does occur, an official such as the director of an emergency services agency will use local operating procedures to decide whether to inform those affected with emergency instructions. This director will use their local expertise to issue a message on the impact and recommend action through a web-based interface provided to them by the Department

of Homeland Security.

This message will go from the local emergency official to the appropriate NWS office through a HAZCollect server located at the National Weather Service Headquarters near the Nation's capital. Once received at the NWS office, it will be directed to our All Hazards NOAA Weather Radio and activate the EAS system for play across all broadcast radio and cable television stations. The message will also be sent via various other communication channels to ensure the widest distribution possible.

HAZCollect achieves the widest possible distribution of critical non-

Non-Weather-Related Events	NWR-SAME Code	Status
<i>State and Local Codes-Optional</i>		
Avalanche Watch	AVA	Operational
Avalanche Warning	AWW	Operational
Child Abduction Emergency	CAE	Operational
Civil Danger Warning	CDW	Operational
Civil Emergency Message	CEM	Operational
Earthquake Warning	EQW	Operational
Evacuation Immediate	EVI	Operational
Fire Warning	FRW	Operational
Hazardous Materials Warning	HMW	Operational
Law Enforcement Warning	LEW	Operational
Local Area Emergency	LAE	Operational
911 Telephone Outage Emergency	TOE	Operational
Nuclear Power Plant Warning	NUW	Operational
Radiological Hazard Warning	RHW	Operational
Shelter in Place Warning	SPW	Operational
Volcano Warning	VOW	Operational

***This table includes the possible non-weather emergency messages that can be relayed via HAZCollect across NOAA Weather Radio and ultimately all commercial broadcast systems.***



## Spanish Website and Proposed Radio Transmitter by Carolina Horne

In an effort to reach a greater percentage of the population in our County Warning Area (CWA) we have begun the process to implement an all-Spanish language website. With new software that enables us to directly translate the English product into Spanish we can make all our products available to the Spanish speaking community. This will allow the Spanish community to access all of our forecast including watches/warnings/advisories and observations providing

critical life-saving information. This website will be accessible from the main Monterey/San Francisco Bay Area website through a link that says "En Español".

We are also attempting to organize funding for the purchase of a separate NOAA weather radio transmitter dedicated to broadcasting weather messages in Spanish across the region. This is directly in line with our mission to protect life, and property, and the enhancement of the national economy. With

a large agricultural community stretching from Napa and Sonoma to southern Monterey county that primarily speak Spanish we feel this community is a high priority. However due to budget issues funding for a new radio transmitter is not available. Therefore over the next year we hope the community we serve, including local organizations, county government, and private industry, will pull together to make this dream a reality.

**Visit:**  
**[www.nws.noaa.gov/nwrl](http://www.nws.noaa.gov/nwrl)** for  
**complete**  
**nationwide**  
**information**  
**about NOAA**  
**All Hazards**  
**Radio.**



**NOAA All Hazards Radios are available for purchase at many electronics retailers throughout the Bay Area.**

**Check out some of the offices that have already launched Spanish websites:**

**El Paso:** [www.srh.noaa.gov/elpl/](http://www.srh.noaa.gov/elpl/)  
**San Diego:** [www.wrh.noaa.gov/sgxl/](http://www.wrh.noaa.gov/sgxl/)  
**Hanford:** [www.wrh.noaa.gov/hnxl/](http://www.wrh.noaa.gov/hnxl/)

### **San Francisco Bay Area NOAA All Hazards Radio transmitters**

- San Francisco Bay Area broadcast - transmitting at 162.400 MHz
- South San Francisco Bay/ Monterey Bay Area broadcast - transmitting at 162.550 MHz
- South Bay/ Monterey Bay Marine Radio broadcast - transmitting at 162.450 MHz
- North Bay Marine broadcast - transmitting at 162.500 MHz
- East Bay Area broadcast - transmitting at 162.425 MHz



**For more  
information  
about  
SKYWARN  
Recognition  
Day, visit the  
website at  
[hamradio.noaa.gov](http://hamradio.noaa.gov)**

## SKYWARN Recognition Day 2005

The National Weather Service (NWS), in cooperation with the Amateur Radio Relay League, sponsored SKYWARN Recognition Day on December 3, 2004. This was the 7<sup>th</sup> year of the event and the second consecutive year that NWS Monterey participated.

SKYWARN Recognition Day celebrates the vital public service contributions that amateur radio operators make during NWS severe weather warning operations volunteering their time and use of their equipment as a public service. In actual severe weather emergencies, HAMs operate base station at many local Weather Forecast Of-

fices (WFOs) around the country to gather reports of severe weather from around the local forecast area as well as and pass along NWS watches and warnings. Many HAMs also are certified storm spotters, often times known as SKYWARN Spotters.

For this year's SKYWARN Recognition Day, around 100 NWS offices from around the country, along with the National Hurricane Center and the Canadian Prairie Storm Prediction Center in Winnipeg, Manitoba, manned their HAM stations for up to 24 hrs (00Z-24Z, 12/4/04). During the event, amateur stations exchanged QSO information with as many

by Scott Kennedy

NWS stations as possible.

NWS Monterey operated on 80, 40, 20, 10, 2 meters, 70 cm, and APRS. Operators exchanged their call sign, signal report, QTH, and a one or two word description of their weather. Volunteer operators at NWS Monterey, using our new station call, WX6MTR, made 111 contacts, working 27 states and 22 NWS Weather Forecast Offices. We also made contacts with two stations in Canada, one on Vancouver Island and one in Toronto, and with a ship 26 miles west of Cabo San Lucas. Our farthest contact this year was with NWS Caribou, ME via APRS. We also made contacts with many local hams and spotters using repeaters that reached into the San Francisco Bay area. Thank you to everyone who participated and volunteered during this year's event.



Larry, KE6PPE, Todd, KI8CX, Rocky, W6DNE, and David, W6IIQ working HF rigs during SKYWARN Day.



Many offices designed QSL cards for SKYWARN Recognition Day. NWS Monterey's card is shown above. If you made contact with us during the event and would like to receive a card, go to the SKYWARN Day link to the left and select the QSL Card info link for instructions.

## Citizens Weather Observing Program by Scott Kennedy

The National Weather Service relies on observations from many sources to forecast and verify weather conditions in their forecast area. Observation sites include airport Automated Surface Observing Systems (ASOS), Remote Automated Weather Stations (RAWS), and other automated weather sites. Many private citizens and amateur radio operators with weather stations and internet access participate in a program that allows them send their weather data to the internet for others to use. This program is called the Citizen Weather Observer Program (CWOP).

If you have a weather station and would like to participate in this program, it is fairly simple and free. Follow the link to the right for procedures to register and for free software to become part of this valuable

network of weather stations around the world. Amateur radio operators will utilize their call sign for their citizens weather designation while non-hams will be assigned a CW designator. It will take about two weeks after registering before you data will show up on weather networks.

Some of the networks where your data will show up are findu.com, wxqa.com, the National Hurricane Center's CWOP webpage (link found to the right), and the MesoW-

est summary, developed by the University of Utah (shown in the image below).

NWS Monterey utilizes the MesoWest summary quite a bit as it provides a nice table to summarize all observations in our County Warning Area (CWA). For a list of all observations in our CWA follow the link at the bottom left, click on the map near the San Francisco Bay and select the settings "All Networks" and "CA-San Francisco Bay Area/Monterey CWA."

**Information  
about  
registering with  
CWOP as well  
as free software  
link to:  
[www.fiu.edu/  
orgs/w4ehw/  
CWOP-  
Main.html](http://www.fiu.edu/orgs/w4ehw/CWOP-Main.html)**

### Observations and Summaries

Region:  Product:    
[ROMAN Home](#) [MesoWest Home](#) [Weather Near Fires](#) [Main Help](#) [Status](#)

### Current Weather Summary for CA - San Francisco Bay Area/Monterey CWA

Settings:   Reports within last    
 Time:  :  UTC  /  /

As of: 21:52 UTC 12/16/2005 [Sort by name](#) [Help](#) [QC Flag: Ok, Caution, Suspect](#)

CA005: Sonoma and Marin Counties																			
Station	Elev	Time		Current						24 Hour					Precipitation				
		LOCAL	UTC	TEMP	RH	WIND	DRCT	P	KW	MAX	MIN	MAX	MIN	MAX	G	1 HR	3 HR	6 HR	24 HR
MIDDLE PEAK	2490 ft	1330PST	2130	46	78	6	N	7	54	40	85	30	15	0	0	0	0	0	0
HAWKEYE	2000 ft	1255PST	2055	46	93	4	S	8	58	42	93	53	9	0	0	0	0	0	0
Guerneville	1503 ft	1300PST	2100	41	100	0	W	1	41	38	100	100	2	0	-	-	-	-	-
BIG ROCK	1500 ft	1330PST	2130	39	100	4	SSE	8	58	37	100	35	16	0	0	0	0	0	0
WOODACRE	1400 ft	1330PST	2130	40	95	5	SE	9	58	37	95	31	17	0	0	0	0	0	0
BARNABY	810 ft	1325PST	2125	40	100	0	N	7	64	39	100	40	16	0	0	0	0	0	0
CV1766 Santa Ros	761 ft	1330PST	2130	44	81	2	WNW	5	59	28	100	49	8	-	-	-	-	-	-
CV3741 Occidenta	617 ft	1330PST	2130	42	89	1	SW	-	44	40	97	86	-	-	-	-	-	-	-
Cloverdale	562 ft	1300PST	2100	49	52	6	SSE	7	60	31	83	26	7	0	0	0	0	0	0
SANTA ROSA	560 ft	1255PST	2055	41	100	1	SE	5	59	35	100	48	11	0	0	0	0.01	0.01	0.01
WBHN Healdsburg	312 ft	1320PST	2120	40	92	2	S	-	57	31	95	49	-	-	-	-	-	-	-
Healdsburg	278 ft	1300PST	2100	40	93	2	ESE	6	58	31	96	47	7	0	0	0	0	0	0
Bennett Valley	270 ft	0200PST	1000	25	95	2	SE	-	51	25	95	46	-	0	0	0	0	0	0
KF6YUA Sebastopo	230 ft	1330PST	2130	40	96	0	E	3	56	31	97	64	5	-	-	-	-	-	-
CV3724 Sebastopo	223 ft	1325PST	2125	41	91	3	NE	-	57	32	93	58	-	-	-	-	-	-	-
Downtown	200 ft	1300PST	2100	42	92	2	E	4	58	33	100	43	9	0	0	0	0	0	0
CV3628 Santa Ros	197 ft	1315PST	2115	43	95	0	NNE	5	57	31	98	48	5	-	-	-	-	-	-
Santa Rosa	152 ft	1300PST	2100	43	95	0	NNW	-	57	32	98	48	5	0	0	0	0	0	0
CV3627 Sabastopo	144 ft	1330PST	2130	41	93	1	SSE	-	59	32	95	53	-	-	-	-	-	-	-
Santa Rosa Sonom	125 ft	1250PST	2050	41	93	7	SE	-	57	27	100	51	-	-	-	-	-	-	-
CV0677 Santa Ros	105 ft	1330PST	2130	43	77	1	NE	3	58	30	96	46	8	-	-	-	-	-	0.01
POINT REYES	80 ft	1330PST	2130	51	7	-	N	-	54	44	57	-	-	-	-	-	-	-	-
KF6TYS Guernevil	62 ft	1325PST	2125	41	100	0	WSW	3	41	38	100	100	3	-	-	-	-	-	0.01
PETALUMA - LYNCH	10 ft	1255PST	2055	37	-	-	N	-	60	31	-	-	-	-	-	-	-	-	-

**The MesoWest observation page for part of NWS Monterey's County Warning Area is shown to the right. This data can be accessed from:  
[raws.wrh.noaa.gov/roman/](http://raws.wrh.noaa.gov/roman/)**



**Editor:**  
**Scott Kennedy**

*San Francisco/  
Monterey Bay  
Storm Spotters:*

*Anytime you  
observe any of the  
adjacent weather  
conditions, please  
call us with your  
report.*

*Please include  
your name and  
spotter number  
when calling.*

**National Weather Service  
San Francisco Bay Area  
Weather Forecast Office  
21 Grace Hopper Ave, Stop 5  
Monterey, CA 93943-5505**

**Check us out online at: [www.wrh.noaa.gov/mtr](http://www.wrh.noaa.gov/mtr)**

### **Spotter Criteria**

- **TORNADO** (on the ground) or **FUNNEL CLOUD** (not touching the ground)
- **THUNDERSTORM** (lightning seen/thunder heard)
- **HAIL** of any size
- **WIND** estimated or measured at 35 mph or more
- **RAINFALL** one-quarter inch (.25) or more in one hour or two inches in 6 hours
- **FLOODING** of any kind
- **VISIBILITY** less than 1/4 mile, for any reason
- **SNOWFALL** of any amount
- Weather related **DAMAGE** and/or **DEATHS** and/or **INJURIES**